DRIVER

AUGUST 1972

HANGIN' IN THERE OVER THE LABOR DAY WEEKEND

DECISION DRIVING

COMPLETE IGNITION TUNEUP

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U.S. INTERNATIONAL TRANSPORTATION EXPOSITION

TRANSPO 72

DRIVER

Getting it all together at U.S. International Transportation Exposition

TRANSPO

"Urban transportation that is in agony today will be in chaos long before the year 2000, unless we take prompt and decisive action to provide mobility required by the city environment." These words by Secretary of Transportation John Volpe are the key to what the recent U.S. International Transportation Exposition (Transpo 72) was all about.

The "agony" referred to by Secretary Volpe includes not only traffic congestion, but environmental pollution and the staggering loss of lives on U.S. and foreign roads. (The estimated 1971 total for the U.S. is 55,200.) Among the approximately 2 million visitors to Transpo were more than 5,000 transportation specialists; individuals who will be creating the solutions to tomorrow's transportation demands, and working on the current transportation crises affecting much of the world's population. Transpo was not only a meeting ground for these people, but a showcase of new transportation equipment, products, and technologies. All in all, "Transpo 72" was one BIG happening.

Three areas of particular interest to your editor were a slew of *international* experimental safety vehicles, a variety of people movers (rapid transit systems), and some far-out crash restraint systems. Transpo concerned all modes of transportation, of course, with some very impressive passenger and cargo aircraft on display, but for DRIVER'S purposes we'll stay on the ground.

continued

DRIVER

THE
TRAFFIC SAFETY MAGAZINE
FOR THE
MILITARY DRIVER

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PUBLICATION OF DRIVER MAGAZINE TO BE REDUCED

As a result of budget cuts brought about by the continuing austerity program, DRIVER magazine printing funds have been reduced by 25%. This action has resulted in the necessity of reducing publication to nine monthly copies per year. Therefore, the September-October 1972 and February 1973 issues have been earmarked for suspension. Readers who have been notified their contributions would appear in those issues can look for them at a later date.

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THE EDITOR SPEAKS

DOUBLE CLUTCH

"OUT-TRACKING"

According to a statement made in "Showdown at Mira Loma," May '71 DRIVER, "Out-tracking is a phenomenon understood by few motorcyclists." The article went on to explain that, to make a maneuver properly and as quickly as possible, the rider must first turn in the opposite direction. That is, to go left, first steer right, and vice versa.

As we predicted, letters and phone calls from indignant riders protested receiving such basic instructions on how to steer a bike. Some considered the "out-tracking" theory ridiculous (even a novice knows enough to steer and lean into a turn). Others were sure that the article was in error in contending that "a rider of the typical motorcycle on the road cannot avoid collisions or road hazards as well as can the automobile driver." (Everybody knows a bike can out-maneuver a car any time.)

Of course, we had inserted the "basic" information only for the edification of those who might not have been aware of the proper procedure. The disturbing statement concerning maneuverability and hazard-avoidance (even at 37 mph) was made by Harry Hurt, head of the Safety Division for USC's Institute of Aerospace Safety and Management, who conducted the behind-the-wheel/handle bars collision avoidance course and test for some 120 doubtful driving/riding "experts," including DRIVER'S Technical Editor.

Since then, the USAF accident reports have continued to reflect a disturbing number of motorcyclists failing to negotiate curves or to successfully execute proper emergency maneuvers. One of the more recent cases involved two sergeants riding double on a 1969 Suzuki 350. The machine "out-tracked" while entering a left-hand curve at 45 mph and contacted the right curbing, injuring the driver and throwing the passenger to his death.

This fatal accident might have been avoided by throttling down and using the proper steering procedure; but the driver had very little cycling experience, and had carried a passenger (his wife) on only a few occasions. He had completed AFR 50-24 Courses I, II, and IV, but had scored only 80 of a possible 119 points on the Course I two-wheeled vehicle unit. Both sergeants had also been briefed on motorcycle safety by their supervisor 10 days prior to the accident. The driver's training, in fact, had covered a wide range of techniques and

continued on page 27

continued

TRANSPO 72

EXPERIMENTAL SAFETY VEHICLES (ESVs)

Styling, performance, and other features are subordinated to safety in these prototypes of cars of the not-too-distant future. In fact, they constitute a historical first in car design with safety as the *primary* requirement. The principal objectives in the program are to:

INTERNATIONAL ESVs Some of these experimental safety vehicles have never before been on public display. Great interest in the vehicles was shown by the huge crowds at Transpo 72, perhaps indicating a public desire and willingness to pay more for safer vehicles. Vehicles shown here are (top to bottom) MG, Mercedes Benz, Toyota, Volkswagen (bottom left), and Fiat (bottom right). An exploded view of the Volvo is shown on page 4 to give an idea of some of the features to be found in ESVs.

- Demonstrate the feasibility and performance of new safety features as forerunners to regulations requiring similar safety performance for mass production vehicles sold to the public.
- Develop techniques for designing safety into a vehicle as a whole, rather than as piecemeal "add-ons."

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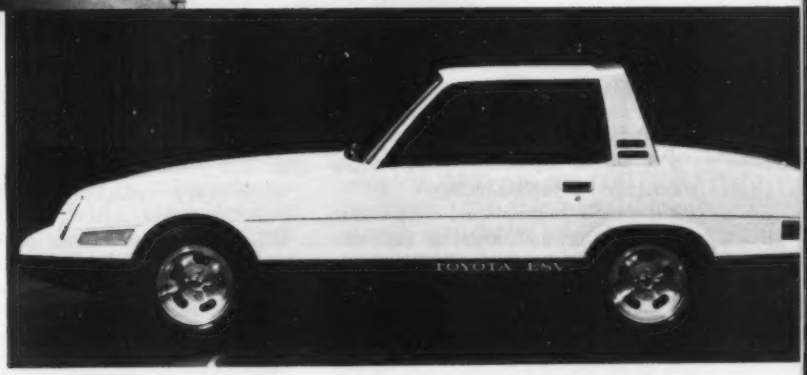
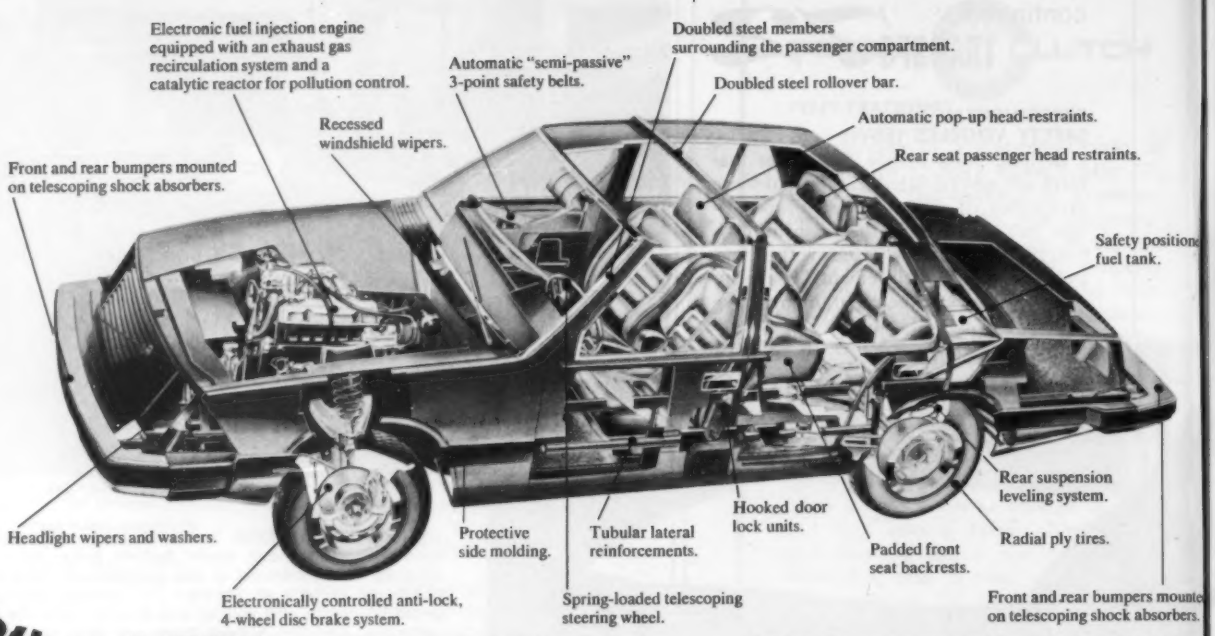


international ESVs


Electronic fuel injection engine equipped with an exhaust gas recirculation system and a catalytic reactor for pollution control.
Automatic "semi-passive" 3-point safety belts.
Doubled steel members surrounding the passenger compartment.
Doubled steel rollover bar.
Automatic pop-up head-restraints.
Rear seat passenger head restraints.
Recessed windshield wipers.
Front and rear bumpers mounted on telescoping shock absorbers.
Safety positione fuel tank.
Rear suspension leveling system.
Radial ply tires.
Front and rear bumpers mounte on telescoping shock absorbers.
Hooked door lock units.
Padded front seat backrests.
Tubular lateral reinforcements.
Protective side molding.
Headlight wipers and washers.
Electronically controlled anti-lock, 4-wheel disc brake system.
Spring-loaded telescoping steering wheel.

International ESVs

Volvo Experimental Safety Car Specifications

Length 205.7″	Track, front 58.3″
Width 71.7″	Track, rear 57.7″
Height 55.9″	Weight 3200 lbs.
Wheelbase 106.4″	

- Stimulate the development of new technology in vehicle safety.
- Promote international cooperation in developing and sharing the new technology on a continuing basis as rapidly as it develops, to reflect worldwide safety needs and research experience in the automotive field.

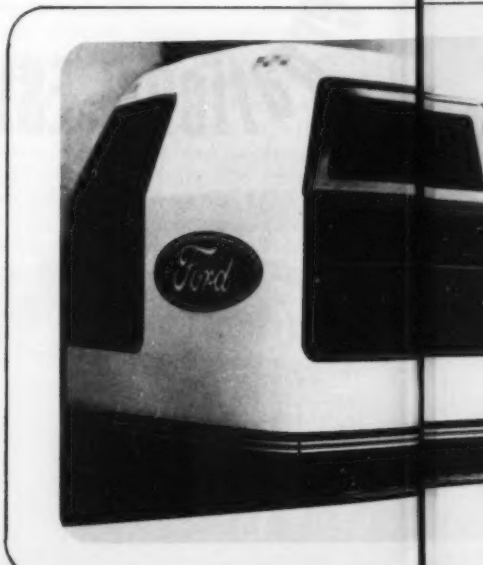
The international experimental safety vehicles shown at Transpo fill a void in the ESV program which exists because the U.S. program has concentrated only on standard-size cars. Thus, the international compact and subcompact ESVs are a logical complement to the U.S. program, and should result in valuable exchange of information for the ultimate purpose of saving lives. Every NATO ally having a major auto company is involved in the ESV program, initiated by the U.S. through a NATO committee. Included are Germany, Italy, France, and the United Kingdom. Agreements have also been worked out with the non-NATO countries of Japan and Sweden.

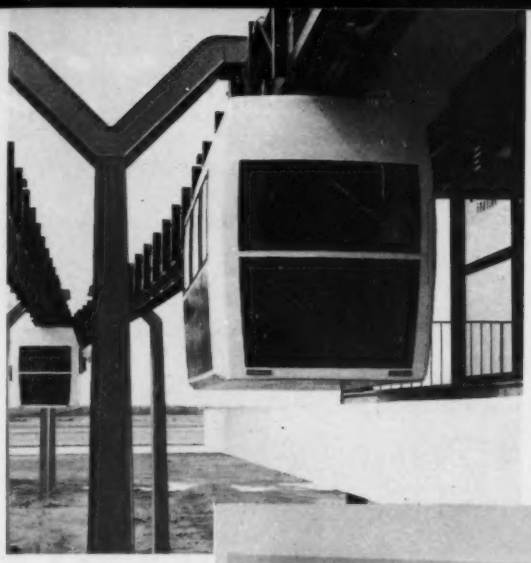
ESV REQUIREMENTS

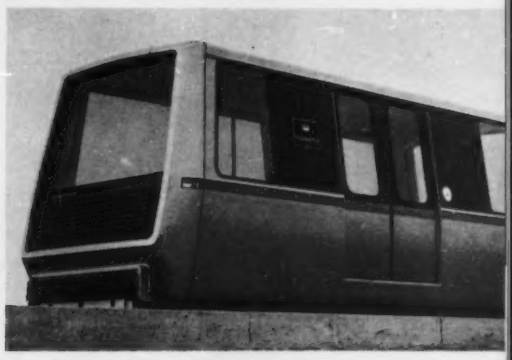
How specified performance standards are met or exceeded is left up to the auto designer. The goal in crash-injury reduction is to protect passengers and drivers from death or serious injury in crashes equivalent to a head-on barrier crash at 50 mph, without presenting unnecessary hazards to other automobiles. The vehicle must meet stringent accident-avoidance specs on braking, steering, handling, lighting, visibility, and other features which will aid the driver in avoiding crashes.

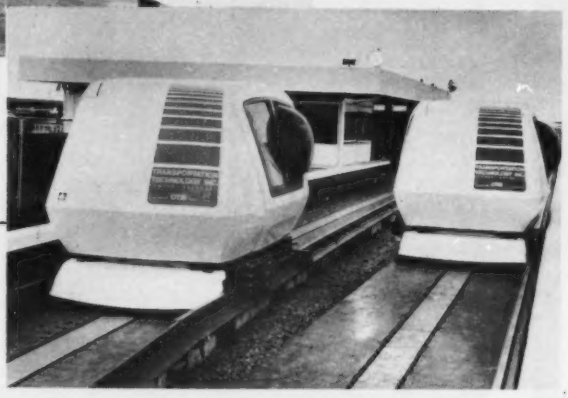
DRIVER feels the ESV program is a first-rate project, which should eventually result in saving many lives. It's important to remember, however, that accident avoidance will remain an essential element in survival on the highway. There will always be a larger vehicle capable of destroying the finest crush-resistant vehicle available to the public. However, the driver of a threatened vehicle can greatly increase his chances for survival by anticipating the unexpected, and by knowing what actions to take in emergency situations.

Meanwhile, you can achieve a degree of safety comparable to that the government has planned for you in requiring installation of *passive* (automatic) restraints—by *actively* restraining yourself with the seat belt and/or shoulder harness already available in your present vehicle.





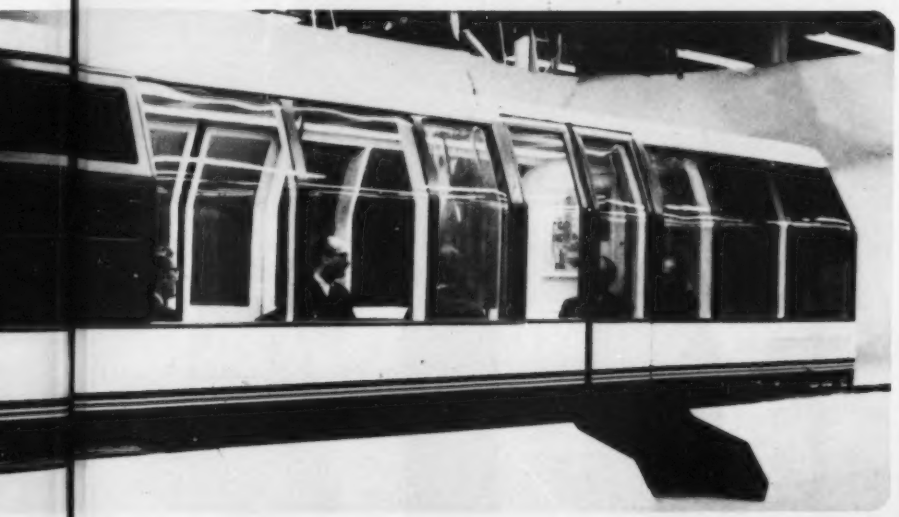




people movers

Four prototype personal rapid transit (PRT) systems designed to meet future urban transportation needs made their debut at Transpo 72.

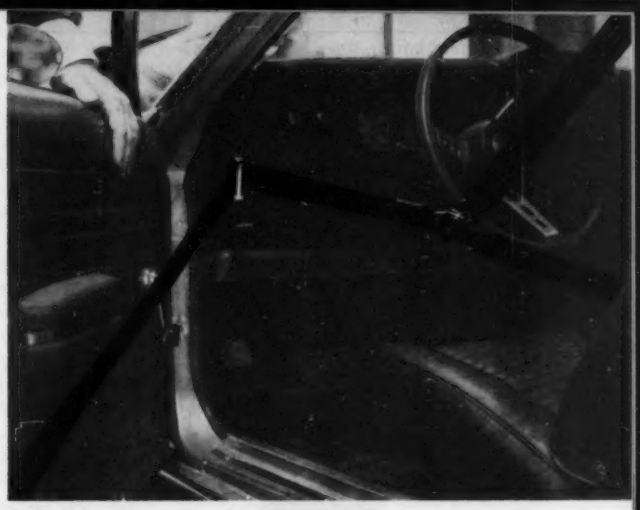
In a typical PRT system, small, independently powered vehicles travel along controlled right-of-ways called "guideways." The passenger enters a station, chooses his destination by pushing a button, and is taken non-stop to that destination by a vehicle which answers the button's command. The system is similar in concept to the operation of an elevator. Each station is off the main guideway so the vehicles can speed directly to their destinations, bypassing all intermediate stops. Speed, switching, and distance between vehicles are computer controlled. The result is a cheap, clean, safe, personal trip from origin to destination — one possible substitute for the auto and a solution to congestion in high-traffic downtown areas, shopping centers, and airport complexes. The four types of people movers on display at Transpo are shown on this page.



THERE WILL BE PEOPLE MOVERS Four Personal Rapid Transit Systems ("people movers") were a feature exhibit at Transpo 72. Designed to be direct competitors for the automobile in urban transportation, the PRT systems were built under contracts with the Urban Mass Transportation Administration of the U.S. Department of Transportation. In the system developed by **Transportation Technology Inc,** subsidiary of Otis Elevator (left above), vehicles carrying up to 10 persons run at 25 mph along a ground-level guideway. Another ground-level system is that of **Dashaveyor Co,** subsidiary of Bendix Corp (above). Its cars seat 12, plus 19 standees, and run at 20 mph. Cars in the system constructed by **Monocab,** subsidiary of Rohr Corp (left), carry 6 persons and run at 17 mph on an overhead monorail guideway. **Ford Motor Co's** system (below) is also elevated. Cars carry 12 seated passengers and 12 standees. All of the demonstration systems, which will give rides to the public, are powered by electric motors.

continued

EVEN "DRIVER" MADE THE SCENE AT TRANSPO The young in particular were interested in the various static military displays. Here the subject is the USAF Traffic Safety Program.



SEAT BELTS HARDER TO IGNORE

It's a proven fact that seatbelts save lives and lessen the severity of passenger injuries in accidents. (More than 30% of all highway deaths could be avoided if seat belts were used.) But, despite this fact, a large number of motorists have some sort of psychological hang-up that keeps them from buckling up—no matter how effective they know the restraints can be. What to do?—that is the question.

Some motorists feel that it is their personal option to take or not to take advantage of the crash restraints installed in their vehicles. However, this stand is not valid, especially when the safety of other motorists is concerned. For example, a vehicle violently lurches onto the shoulder, only to bounce back onto the highway again and head toward the lane of oncoming traffic. At almost the last second, this driver regains control and safely halts his vehicle. However, had this driver not been held at the controls of his car by his restraints, it might have been a different story. He most likely would have been unable to avoid a head-on collision, perhaps taking the lives of several other motorists in addition to his own.

Since loss of control is not a rare occurrence, before, during, or after a collision, shouldn't seat belt use be a requirement for *all* drivers? The U.S. Government is eventually going the passive restraint route. Cars manufactured after 15 Aug '75 will be required to have restraint systems that call for no action on the part of the occupants. Some of these systems were previewed at Transpo. Meanwhile, a National Highway Traffic Safety Administration proposal, that all states enact seat belt laws, is being considered.

It is a weird feeling to sit in a car while a mechanical device fastens a restraint over your chest and around your waist. Nevertheless, there are several systems available that do just that. Other passive systems employ nets and heavy interior padding. Several of these are shown here, and may wind up in cars built in the near future. We hope that all our readers are aware that the odds for their survival greatly improve if seat belts are used, and that they *always* use them. A preview of almost certain changes in crash restraint legislation which makes them "harder to ignore" is shown below:

1972

Federal Motor Vehicle Standard 208 required that all cars built after 1 Jan '72 provide in all outside seating positions, front and rear, both lap and shoulder belts of a three-point design. The reg further requires a warning device including a buzzer and a lighted warning to fasten restraints as soon as the unbelted driver turns on the ignition and places the gear selector in a forward or drive position.

1973

The National Highway Traffic Safety Administration says auto makers should install a "passive" system or an ignition-interlock that would prevent the car engine from starting unless seat belt systems in all occupied front seat positions are fastened.

1975

A passive occupant protection system required in every position.

TRANSPO SOMETHING NEW

Transpo 72 was the first all-transportation trade show in history. Judging from the enthusiastic crowds at all the safety exhibits, DRIVER believes it may have been something more. It may even result in a shift in public attitude from passing interest in the government's efforts toward reducing highway fatalities, to avid support. We hope so. ●

passive restraints

PASSIVE RESTRAINTS will be the name of the game in 1975, and the industry is responding with some ingenious systems. The series of photos of the young lady being strapped into her seat automatically is a good example. It works this way: (1) a sensor in the seat cushion activates the system when the seat is occupied and the ignition turned on; (2) two mechanical "arms" slide upward from each side of the seat; (3) the right arm carries the combined lap and shoulder belt to the mid-point where the belt is transferred to the left arm; (4) both arms start to retract, but the belt is now carried by the left arm to the buckle (located on the seat frame) and fastened; (5) the arms fully retract to their original neutral positions under the seat. The other two systems shown are simpler but are not hidden, as with the one first explained. DRIVER's suggestion: be years ahead of your time by **actively** buckling yourself up before you drive . . . today!

MISS DRIVER

MARTHA LAHAM

Our Navy contact sent us a page of information on how larger tires 'slow' your speedometer (p. 12). So I thought I'd continue the theme by passing on some more wise words on tire care, which I read in Tire Industry Safety Concil News:

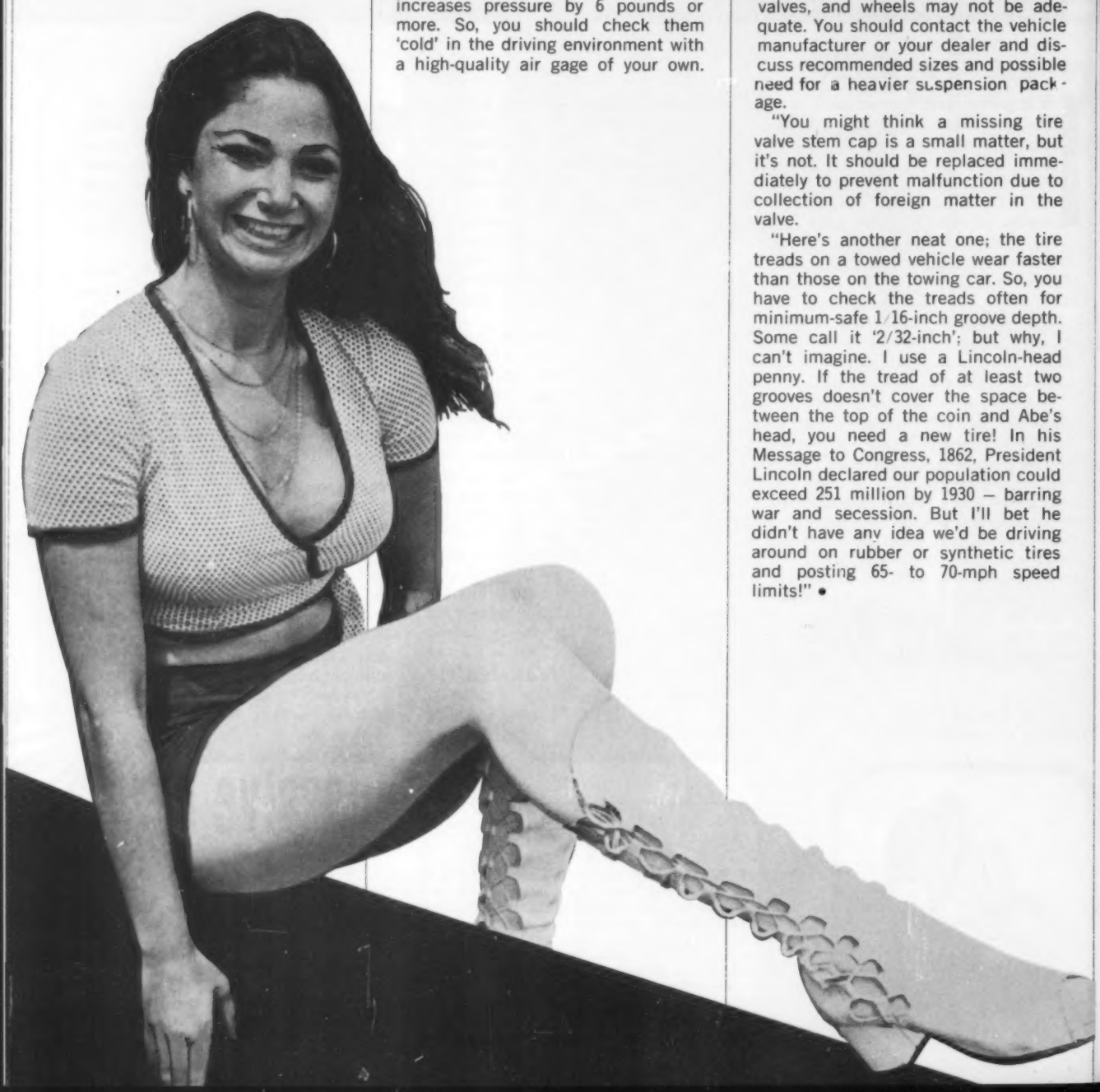
"Proper inflation is a 'must' for tire safety and good mileage life. As you proabably know, many station gages are not very accurate, and driving increases pressure by 6 pounds or more. So, you should check them 'cold' in the driving environment with a high-quality air gage of your own.

"Using your snow tires after winter has passed won't save you any money. The heat build-up at high speeds in warm weather may reduce tire life and even cause disablement! Besides, most states require studded tires to be off your car by April or May; they won't grip a dry surface, and will ruin the roads.

"If you decide to add a camper body to a light truck, the old tires, valves, and wheels may not be adequate. You should contact the vehicle manufacturer or your dealer and discuss recommended sizes and possible need for a heavier suspension package.

"You might think a missing tire valve stem cap is a small matter, but it's not. It should be replaced immediately to prevent malfunction due to collection of foreign matter in the valve.

"Here's another neat one; the tire treads on a towed vehicle wear faster than those on the towing car. So, you have to check the treads often for minimum-safe 1/16-inch groove depth. Some call it '2/32-inch'; but why, I can't imagine. I use a Lincoln-head penny. If the tread of at least two grooves doesn't cover the space between the top of the coin and Abe's head, you need a new tire! In his Message to Congress, 1862, President Lincoln declared our population could exceed 251 million by 1930 — barring war and secession. But I'll bet he didn't have any idea we'd be driving around on rubber or synthetic tires and posting 65- to 70-mph speed limits!" •



the LAW and the AUTOMOBILE

Continuing last month's discussion of negligence, we now apply it to road conditions, speed, and assumption of responsibility.

We began our last discussion of negligence by examining some aspects of automobile and driver conditions. We also told you about a driver who was sued after having been involved in what he thought was a minor accident. Because he had failed to take appropriate action following the fender-scratching episode, the driver found himself in a very poor position to defend himself in a 50 thousand-dollar civil suit.

Now we'll continue by discussing:

ROAD CONDITIONS

One basic principle of all traffic laws is that a driver must adapt his speed and manner of operation to the condition of the roads. General rules offer some guidance, but specific circumstances will have more to do with a judge or jury's findings. For instance, when two vehicles approach a narrow bridge, the one that is closer to it has priority. Some courts, however, have held that such priority will not be recognized if that driver had speeded up in order to arrive there ahead of the other car. That's purposeful *negligence*.

One driver was speeding along a country road and drove over a small pile of stones. Several stones were thrown back and through the windshield of the car following, injuring the driver. Now wouldn't you think that was purely accidental? Well, the court didn't. The ruling handed down was that the pile of stones was in plain sight, and the danger was "foreseeable." The driver should have recognized the hazard and adjusted his speed accordingly. So, it appears, you're not entitled to use the road as if you were the only one driving on it; if you do, you're *negligent*.

If the road is rough and curving, and you're driving a lightweight car, the posted maximum speed limit may not be safe. If you have an accident, or are apprehended while skidding, or bouncing about, you may be found *negligent*.

SPEED

Driving strictly within posted speed limits on a smooth road in fair weather may not keep you from being cited, especially if you have an accident. You might even be held *negligent* for driving 20 in a 30-mph zone. If the surrounding circumstances warn of danger, even 10 mph may be too fast. Courts often state: "A driver must be able to stop within the assured clear distance ahead," or, "A driver must coordinate ability to stop with ability to see."

In one case a man was fined for speeding while driving less than 10 mph! It was one of those bumper-to-bumper, stop-and-go situations. He fed his machine a little too much gas, and rammed the car ahead as it moved out slowly. The court ruled he was "driving too fast for conditions."

RIGHT-OF-WAY

This is the most common traffic problem, and was solved in the past by applying the rule: "Whosoever gets there first shall have priority."

Today, however, the situation is more complicated. There are steady lights and flashing lights; green, amber, and red lights; caution signs, yield signs, and stop signs; railroad crossing signals and cross-bars; and freeways with multiple directional signs and other modern-day innovations. . .all designed to affect your right-of-way. If you have any doubt as to who has the right-of-way in a specific situation (such as the driver on your right at an intersection), check your state vehicle code book.

Even though you have committed the rules to memory, don't let your decisions rest entirely on the printed word; your precious right-of-way is always subject to change, according to the applicable circumstances of the moment. The courts have held that a green light is not an irrefutable command to go; only "qualified permission to proceed safely."

A green light does not give you the right-of-way over a pedestrian who is already lawfully crossing an intersection. You must yield him the right-of-way or risk being found *negligent* if you harm him or even ruffle his dignity. In one such case the court ruled: "His right-of-way is not to be measured in fractions of an inch, or tested in split seconds. He is entitled not to just as much space as his body, clothes, and buttons require, but to as much as will afford him safe passage. The pedestrian's heart as well as his body should be free from attack." So, if you only frighten him half to death, you could be held *negligent*.

In other circumstances, both drivers involved in an accident could be held responsible, and the judge would have to make like old King Solomon. Suppose you backed out of a super market parking stall—and another driver did the same thing, at the same time, right behind you. If you both had enough witnesses and proof that neither driver had begun to back out an inch or a split second after the other, the judge might smile and declare you mutually responsible. If no one was hurt, and the damage negligible, he might just suggest you each go home and worry about your own damages.

The thing to remember is that, regardless of who "has" the right-of-way, the last person who could have prevented the accident—and did not do so—will normally be held responsible. This is known variously as "The Law of Last Resort," "The Last Clear Chance Doctrine," and similar titles. There can be some very fine distinctions made and contested. You can be held liable under this rule, even though you did not observe or recognize the other driver's (or pedestrian's) position of peril, provided the failure to recognize was due to your not having been alert. Or, you may be held responsible under similar circumstances, but charged with *subsequent negligence*. That is to say that, although the other party created the accident situation, you were subsequently negligent in not taking appropriate action to prevent the accident—assuming, of course, that such a course of action was available. Under this variation of the rule, you can be held liable only if you actually observed or recognized the other person's position of peril and failed to take preventive action. But you might go free if you can convince the judge that you did not realize the other person was in peril.

To illustrate the above, let us assume you are driving down a main highway. A driver pulls onto the highway from a side-road and stalls his car in your lane. You happen to be looking off to one side and don't see the stalled car in time. Crunch! You could

continued on page 27

INTELLIGENT MOTORCYCLING PART III

MOTORCYCLE CONTROLS

The throttle, clutch, steering damper, shocks, and even the side stand require close attention. Proper maintenance, adjustment, and use will make the difference between a safe, easy-riding bike and a potential death trap.

THROTTLE

Check out the cycle throttle carefully before you take a bike for a spin. Does it have a long or short travel? This is important, since it determines the amount of power delivered per inch of throttle you crank in. Many modern cycles have more horsepower than the average rider can use. "Fishtailing" or "breaking loose" can cause the novice rider to lose control. More common but also a hazard is the tendency of the novice to grab a handful of throttle and roar away from an intersection, only to have to stand on the brake to avoid piling into the cars waiting at the next stoplight. This misuse of the throttle is hard on the bike, and gives the public a bad image of motorcycling. It also endangers the rider's health and welfare.

When you have started the engine, rev it up and down a few times to get the feel of the power available. Then apply just enough power to get the machine underway and up to speed through use of the gears. The throttle on a motorcycle has a tendency to stick in the open position. This attribute, along with bad brakes and snapping clutch cables, has probably accounted for a good many of the "loss-of-control" type accidents. The major reasons are kinked or frayed throttle cable wires and dirt between the slide and the carburetor.

Again, preventive maintenance is the answer, but always be prepared to have the throttle stick at any position. Gear your mind to this event, and it will not catch you unprepared. If and when the throttle sticks, disengage the clutch lever and begin braking. The motor (relieved of its load) will begin to scream, so reach up and hit the kill button or ignition switch. When you have the machine safely stopped, make a thorough examination of all parts of the throttle linkage. If necessary, hitch a ride back to town and get new parts.

CLUTCH

Some motorcycle clutches engage at the end of lever release, and others at the beginning. A good way to find out how yours operates is to start the motor and gently release the clutch against low gear to find the engagement point.

Next determine whether it is a "gentleman's" or a racing-type clutch. The former is smooth, easily depressed, and engages slowly, while the racing clutch has stiff springs and is designed to come on all at once. A fast-acting clutch of this type coupled with a 40 or 50 horsepower engine can loop a cycle, or even leave the rider behind as it takes off.

The experienced rider releases the clutch lever smoothly and steadily while applying power with the throttle. The result is a smooth takeoff, conducive to long motorcycle life and much less irritating to the viewing public. If you like the fast takeoff, get an AMA card and take up legal, supervised dragging or flat track. Both are sure to satisfy anyone's urge for riding the rear wheel.

The gear shift is operated by a foot pedal on almost all modern motorcycles. However, it varies in position and mode of operation. For example, most British makes have the pedal on the right side and follow an "up for low and down for second,

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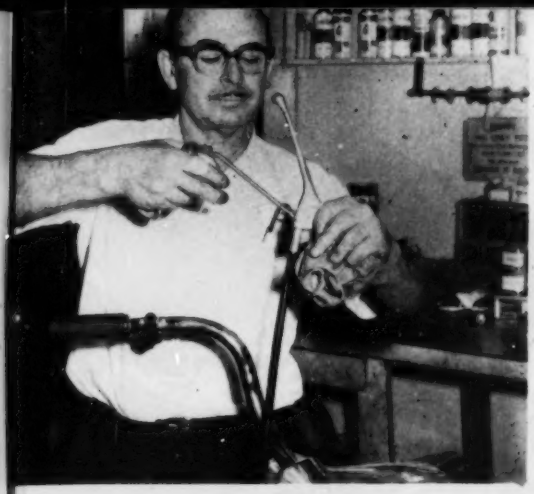
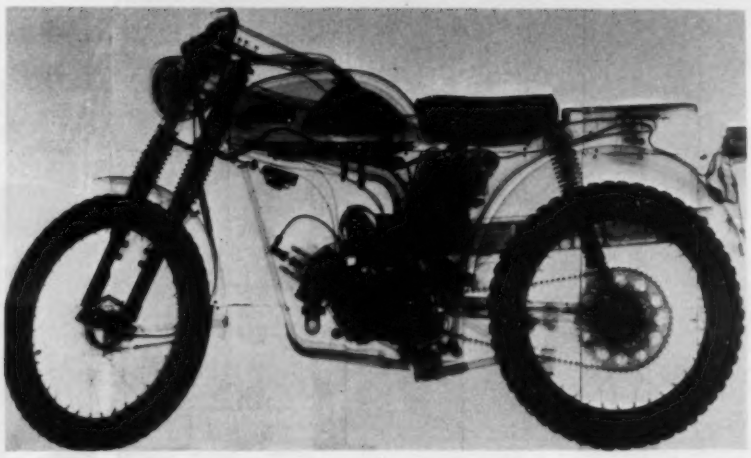




third, and fourth" pattern. The Triumph and 1964 BSA models have a right-hand lever, but reverse the pattern to down for low and the balance of the gears are changed by toeing upwards. Most German machines use this pattern, but with the lever on the left side. The Japanese have followed this lead, although they have one new design which allows a change in the up-and-down pattern.

Why are gear lever differences important? An example will illustrate this point. You are driving a new machine after years of operating one with the gear lever on the opposite side. You are tearing down a long hill, and a herd of mountain goats comes out from behind a granite outcropping. What do you do? You automatically stomp down on what used to be the brake on your other machine, only now it's the gear shift lever; and presto. . .you are in a higher gear, sailing through the goats!

Ask any racer who rides one type of machine on the street and another on the track. He will probably tell you that there are times he has to pause and recall which side the gear lever is on, and which shift pattern it has. If you are a street rider, it is extremely important that your responses to all emergencies be automatic. There is virtually no time to think about which foot you are going to use when someone stops their Greyhound in front of you. You had best leave all your thinking to your conditioned reflexes. That is why it is a good idea to stay with one shift pattern. . .especially if you ride both the street and the track. Again, don't forget to leave the transmission in neutral until you are ready to travel.

SIDE STAND

While not strictly a control, the side stand used to support a bike at rest needs some attention. The bicycle type which consists of a U-shaped piece of metal is not much of a problem, since it will just bounce around on the street if it gets away from its holder. The conventional side stand, however, can be a killer.

Another "for instance": while taking off on a mountain road one sunny afternoon. I neglected to retract the side stand on my 21-inch Velocette. While banking into the first left turn, the stand touched pavement and, before kicking up automatically (which it was supposed to do), it lifted the bike off the street and caused an instantaneous loss of control.

The bike recovered itself with no help from me, but I learned a good lesson. Make it a habit to check and see if the stand is up, and assure yourself that the spring or other holding device is in good condition.

STEERING DAMPER

Often neglected in checking cycle controls is the steering damper control, located directly over the steering head assembly on some machines. Turning it clockwise will increase the resistance on the forks and wheel when turned in either direction. The purpose of this stiffening action is to allow the cycle to track straighter and with less effort by the rider when traversing a rough surface. It may be left free or nearly free when the machine is used on smooth surfaces. If your bike is equipped with this control, use it with great care. If the steering assembly is too tight, it can cause poor control on any surface. Adjust it gradually, and set it to suit your own particular requirements.

ADJUSTABLE SHOCKS

Adjustable shock absorbers can be approached in the same manner. . . by trying the various settings to determine which will give both the easiest ride and best control on varying surfaces. Shocks which are too stiff will give a jolting ride and cause you to feel you are riding an upended bed frame. Shocks set too mushy will cause the bike to continue to bounce up and down after passing over a bump. This could be the cause of speed wobbles or other loss of control. Experiment with shock settings on different road surfaces until you get the feeling that the machine is holding to the road as well as it can be expected to.

RECAP

To summarize the discussion of motorcycle controls, a bike is more like an airplane than a car. Almost anyone can hop into a four-wheeler and drive down the highway. Like an airplane, a motorcycle can bank, fly (for short distances), and loop—and will react violently and without warning if precise control is neglected.

Treat your cycle with respect. Thoroughly understand each and every control of every machine you ride, even if you are only going for a short spin. A motorcycle will give an excellent performance in return for careful maintenance and control. ●

Editor's note: Next issue, in our fourth installment in this series, Bill Kaysing further discusses the intricacies of motorcycle maintenance.

THE BIG TIRES

"But, Officer, my speedometer says I was doing only 45."

"Sorry about that, mister, but my radar says you were hitting 52 in a 40 zone."

Sound familiar? Why? Are there that many faulty speedometers?

One reason for this occurrence is the popular practice of replacing factory rubber with larger tires; that is, tires larger in circumference.

It's a matter of basic math; a tire with a larger circumference will take more time to complete the circle, and the gidget on the dash may not be telling you the straight story.

There is a gearing mechanism installed in the drive train which lets you know, by way of the speedometer, how fast the wheels are turning. Before your car left the factory, the speedometer was calibrated to indicate (within a mile or so, and sometimes as many as 7 miles) the speeds traveled on the original rubber.

We have published this warning before, but a lot of guys are still replacing the factory equipment with larger tires—but forgetting to have the speed detector recalibrated. If the speedometer gear isn't properly calibrated, and you've gone to larger tires, your car could be running 1 to 10 or more miles faster than the gage reads. If it's 5 to 10 miles faster, it could be a problem, and our sources tell us quite a few have been touched by the long arm of the law because of this "oversight."

So, if you're going to move up to a larger tire, make sure of your speedometer reading; otherwise, you may be paying an additional surcharge for the faster ride. Furthermore, that 5- to 10-mph difference could result in an accident.

You needn't pay the $40 or so to have the speedometer gear readjusted, but you should have it calibrated and carry the card indicating the speed differential with you—and readjust your driving speeds accordingly.●

TIPS FROM TOP DRAG RACER

Current West Coast AA Fuel Dragster record holder Bill Tidwell says:

"I used to be one of those types who dragged on the street almost every night—but no more—wouldn't even consider it because it's so much better and safer on a sanctioned track—you wear a helmet, special protective clothing—are carefully timed, so you really know how you are performing.

"You fellows in the service who want to drag ought to take advantage of the sanctioned tracks all over the country, where you can race several times a week—that's where it's at—I'm really against street racing because it's dangerous for you and other motorists—besides, it's against the law.

"One thing I've learned from drag racing—you can't take shortcuts as far as using good equipment goes. Always use the best Specialty Equipment Manufacturers' Association (SEMA) approved drag racing equipment, a top quality Z90.1 helmet, and racing harness.

"I've also applied my drag racing experience to maintaining and operating my street car. Highway driving is in some ways more risky than dragging on a track, especially if you are not careful about such things as tire condition and pressure, brake condition, and good engine tune.

"Pro drag racing is a disciplined sport, like any other, and to be really good you have to be thorough, careful, and safety conscious in all you do. Once you become a pro, no one has to **tell** you to wear a seat belt—you **want** to wear it." •

1st Lt Douglas C. (Doug) Morris of the 6595th Aerosp Test Wg prepares to make his first run over the 300-yard course for the Vandy 300. Doug won First Place in the "B" Street Stock Class in his Alfa Romeo.

OOVER THE HOLIDAYS

Organize an autocross, maybe?

by Capt Gene Whisnant
1369th Photographic Sq (MAC)
Vandenberg AFB, California

Photos by
Sgt Barry Johnson (1369th Photographic Sq)

Last Memorial Day weekend while 33 professional drivers raced at speeds exceeding 200 mph in the Indy 500, 29 professional airmen never exceeded 35 mph in the "Vandy 300" (300 yards that is) autocross at Vandenberg AFB, California. Though the stakes weren't nearly as high, the fun and excitement experienced by all present made it a memorable event. Add to this, the physical and mental benefits of avoiding the Memorial Day traffic hazards and frustrations, and you have a fine idea for other bases to follow.*

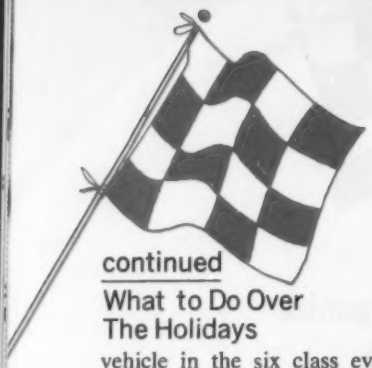
The Vandy 300 was organized by MSgt Thomas H. (Tom) Hegre, 1369th Photo Sq Lab, and is similar to other autocross events in concept. The idea is to challenge driver skill in a contest with time. The driver must maneuver his car through a carefully laid out course marked with pylons. Each driver must make three runs, and is scored on the two best, with penalty time added for either going off the course or striking pylons.

The base parade grounds at Vandenberg set the scene for this event. Entries ranged from Corvettes and Porsches to Dune Buggies and Mustangs. Each car was classed according to power, weight, wheelbase, and handling capabilities. A thorough safety inspection was made of each

continued

**ED NOTE: DRIVER urges all bases to follow the lead and set up holiday auto competition events such as the "Vandy 300."*

Sgt Michael E. (Mike) Galzauska of the 6595th Instrumentation Sq makes last-minute adjustments to his Austin Healey Sprite under the supervision of his pretty wife, Peggy. Fine tune is important in any race, and Mike's adjustments must have been correct; he captured first place in the "C" Street Stock Class.



continued

What to Do Over The Holidays

vehicle in the six class event. Drivers were required to wear helmets and seat belts for the race.

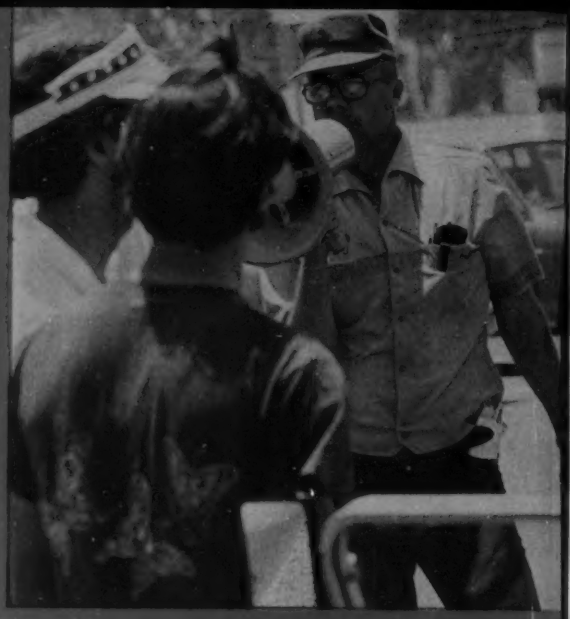
Sergeant Hegre reports setting up the Vandy 300 was not too difficult. His previous experience as an auto club member, and of arranging a gymkhana in 1967 at Turner AFB, Georgia, was a big help. The support received from the 1369th Squadron Commander, Lt Col Charles F. Lemons, as well as the Base Commander and Base Safety Officer was invaluable.

Publicity for the event was started 4 weeks before the race. Timing equipment as well as help in setting up the course and conducting the runs was provided by Major Leon H. Shannon Jr., member of AFLC/Det 41 OOAMA. The Major obtained the timing equipment courtesy the California Central Region Porsche Club of America, of which he is a member. Trophies were donated by Special Services.

Winner of the best time of the day was MSgt Keith G. Nelson of the 394th Strat Msl Sq, driving a Mini-Cooper in the "A" modified Class. He managed an enviable time of 104.865 seconds. Master Sergeant Hegre, competing in the Sedan Class (over 1500cc) won first place in his Cortina GT. Major Shannon took second place in the "C" Street Stock Class in his 914 Porsche.

As Sergeant Hegre pointed out, this sort of activity is not only fun for the contestants, but sharpens driver skill and reaction time. Thus, it is a positive approach to safety in several ways. All that is needed to initiate a similar event at any military installation is the interest and support of assigned personnel as well as command, safety, and legal officials.

MSgt Hegre says he can provide rules and guides to anyone interested, and asks "What better time could there be for your event than the upcoming Labor Day weekend?" •



MSgt Tom Hegre gives the drivers some last-minute instructions concerning the requirement to wear a helmet, and to remove all hub caps and loose objects from the car.

Maj Leon Shannon, performing as the starter for the Vandy 300 Autocross, gives MSgt Keith Nelson the "Get ready" signal.

Maj Leon Shannon anxiously awaits his turn at the course as MSgt Keith Nelson in his Mini Cooper completes his first run. Good coordination of shifting and speed, plus knowledge of the limitations of your vehicle are essentials in racing.

MSgt Keith Nelson's Mini Cooper is not a large car, but is ideal for the challenges of an autocross. Nelson's combined best two runs were 104.865 seconds.

Msgt Tom Hegre maneuvers his Cortina GT through one of the sharp curves, just missing a pylon that would have added time to his run.

Waiting for their second run, MSgt Keith Nelson (front) and the 394th Strat Msl Squadron's SSgt Donald J. (Don) Legendre (rear) watch some of the drivers finish their first run. A person learns a lot about his driving ability, or lack of it, in an autocross.

Maj Orin B. (Bud) Whatley of the 1st Strat Air Div goes wide on a turn in his Corvair Dune Buggy. This might have cost him the best time of the day, since his combined best two runs were 108.124 seconds. A roll bar on such a vehicle is a wise idea for any type of driving.

MOTORSPORTS CLUB NEWS

The Pine State Motorcycle Club is interested in sponsoring a motorcycle road rallye. I am hoping that DRIVER readers will be able to help us with information, rules, safety precautions, judging procedures, checkpoint set-ups; anything that will help us promote a good road rallye for the participants. This information will be sincerely appreciated.

We plan also to sponsor hill climbs, poker runs, and field events for both mini-bikes and motorcycles. Any information on staging these events will be helpful, too.

The goals of our club are to promote better riding safety for all motorcyclists, and present a better image of motorcyclists to the public.

If we can be of assistance to anyone interested in forming a motorcycle club, we will be glad to send a copy of our constitution and bylaws.

All of us enjoy DRIVER very much. Keep up the outstanding work.

TSgt Billy G. Richardson
Vice President
Pine State Motorcycle Club
FTD 212, Loring AFB ME 04750

The 1st Mobile Two Wheel Safety Committee was formed in 1969 after the senseless death of a member of the Group. The rider was thrown from his motorcycle after striking a pig. He was not wearing a helmet, and received fatal skull injuries.

We hold monthly meetings of all Group personnel who own or operate motorcycles. We show safety films, discuss existing and potential hazards, review and update safety regulations, and inspect motorcycles. Any machine failing inspection is grounded until the discrepancies are corrected. We work hand-in-hand with base and civil traffic authorities; and the Philippine Constabulary Traffic Division and the NCOIC of Clark Security Police have lectured at our meetings. We believe our organizational two-wheel safety program, organized by MSgt William Roe and myself, is the oldest program of its type in the U.S. Air Force. Our "Ride for Life" program phase continues the theme of maintaining high motorcycle safety standards. This phase is organized in three parts. Part 1 is a classroom training session. The writer and three other members of the Group Safety Committee explain and demonstrate correct motorcycle riding habits.

During Part 2, the cyclists take a road trip to learn how to cope with typical Philippine driving hazards. Frequent rest stops are scheduled to enable the riders to review and discuss different aspects of the trip. At each stop the riders must check their cycles for loose bolts, cut tires, and such.

Part 3 includes a discussion held on base at the conclusion of the trip. Caravan members review the ride, carefully analyze the dangers encountered, and discuss ways and means of circumventing the hazards on future rides.

The caravan left Clark AB at 0630 on a typical trip, returning at 2000. Children playing on the road, stalled sugar cane trucks, unmarked road hazards, reckless drivers, and animals, as well as oncoming vehicles with extremely bright lights, were among the hazardous objects and conditions encountered.

Defensive driving is particularly important in the Philippines. Vehicles along the roadside have to be watched, since they frequently pull into traffic without signaling. Night driving is especially dangerous because of the many slow-moving, unlighted, animal-drawn vehicles on the roads. Bike riders are constantly reminded to reduce speed on unfamiliar terrain. Dangerous potholes, unmarked curves, narrow wooden bridges, and the dense vegetation bear out the familiar saying: "It is better to drive slowly and arrive late than not to arrive at all."

MSgt Harold D. Moore
1st Mbl Comm Gp (AFCS)
Clark AB, Philippines

The Desert Phantoms Motorcycle Club is a composite road and desert riding organization located at George AFB, California.

The all-military membership is involved in all aspects of motorcycling and road tours sponsored by the Southern California Motorcycle Association. Members also participate in moto-cross and open desert competition.

A feature attraction is the clubhouse, open to active members at all times. During off-duty hours, most of the riders can be found in the repair bay dressing up their touring machines, building choppers, or tuning up for the races.

The Desert Phantoms have an outstanding record of accident-free activities. The key to the club's success is base support and, thanks to assistance from Base Recreational Services and Ground Safety, our club has become one of the finest in the Air Force.

A1C Tom Ferguson, President
Desert Phantoms Motorcycle Club
George AFB CA 92392

A "Senior Citizen's Slalom" gymkhana, a "Coastal Roundevous" rallye, a

THE WINNERS—The Southern Italy Motorsports Association's (SIMA) two rallyes, "Adriatic April Fool Phase I and II," and the "Fiasco's Follies" gymkhana, held on 1 and 2 April, produced four winners. They are (l to r) Sgt Richard (Rich) Tinsley, who carried Sgt James Schultz as navigator; TSgt Renny (Jack) Weiss, who drove with A1C Tracy Shaffer as navigator; SSgt Phillip (Phil) Lawrence, who tied for first place in the second rallye; and A1C Gerald (Jerry) Varney, winner of the first rallye. Jerry's wife, Nancy, rode as navigator. In a short runoff, Weiss broke the tie to get the winner's trophy and Tinsley took second. Lawrence made up for the tough break by winning Class I and Fastest Time of the Day trophies in the gymkhana. Photo courtesy Sgt Tony Duque

"Fiasco's Follies" gymkhana, a two-part "Adriatic April Fool" rallye, and a parking lot gymkhana highlighted springtime activities for the Southern Italy Motorsports Association (SIMA).

The "Senior Citizen's Slalom" involved three conventional divisions (with entrants ranging from Fiats to Porsches), a "Turtle" division (large, unwieldly vans, campers, etc), and a "Powder Puff" division. Contestants made two runs through the tricky slalom course. The winners were adjudged to be the drivers who negotiated their vehicles through the course in the fastest combined times.

Eighteen carloads of SIMA members took part in the "Dr. SIMA's Coastal Roundevouz" rallye, running a circular course along the Italian coast. Despite the windy, rainy day, most of the cars completed the run in good order.

The second gymkhana was run on a course set up on the base Civil Engineering parking lot, and carloads of fun was had by all. The entries were divided into five classes, including a "Powder Puff" class, and a new classification system was used to replace the former engine displacement rating. The new system, computing horsepower, weight, and wheelbase, was considered to be more equitable and made for closer, more competitive runs. A total of 35 entrants made 103 runs through the slalom course.

The "Adriatic April Fool" rallyes were divided into two heats. The first phase consisted of running a course starting at the Air Station, winding through the heel of the Italian "boot," and finishing at Santa Maria de Leuca in southern Italy. Phase two started there and ended at Pulsano. This was a "gimmick" rallye, involving drivers and navigators changing positions and navigators switching cars. In addition to the usual navigation problems, the crews had to count signs and telephone poles, read a series of plaques, and remember a complicated sequence of "magic" words.

TSgt Frank E. Shirar
6917 Security Gp/OI
San Vito Dei Normanni
Air Station, Italy

I am organizing a motorcycle club on Lowry AFB, Colorado. I would like to hear from other clubs concerning their organizing experiences, as well as any major problem areas that were encountered in the process.

Our potential members will appreciate any answers and information that can be used to get our club off the ground.

SSgt Gordon M. Moore
3424 Instructor Sq
Lowry AFB CO 80230

FORMING CLUBS AND REPORTING ACTIVITIES

Experience is a great teacher and, if shared, can be of benefit to others —especially when it comes to motorsports club activities. And that is why "Motorsports Club News" was added to DRIVER magazine's recurring features.

We know of many such base-sponsored clubs, and have included some of their activities in the "News" and in special features about their outstanding contributions to base and local traffic safety programs. But our repeated requests for current club activity reports have netted response from only a few. So we are publicizing our need once more in the hope that we will be able to continue the feature.

One thing that holds up publication of these letters is the lack of full names, military grades, and dependents' status. The sportsman's well known practice of calling Colonel Jones and Sergeant White "Bill Jones" and "Streaky White" is fine for local press releases, but we like to tell who they are in DRIVER magazine. And the same goes for the events; please tell us what kind of a rallye or gymkhana it was, where it was held, and who sponsored it. And we'd also like to hear about your training and safety programs. Pictures, of course, make the activities come alive.

We print the clubs' names as well as the writers' addresses, so that various club members can correspond and swap ideas; also so that potential club organizers can gain from the experiences of others, and non-club members will become acquainted with the advantages that accrue from membership.

Our past offer to furnish a copy of a model club constitution upon request still stands, but we are not set up administratively to furnish detailed information and guidance. However, your Safety people can steer you to AFRs 34-4, 176-1, 34-67, and 87-3, and AFP 30-3, which contain all requirements for forming and operating a motorcycle, automobile, snowmobile, or boating club, or holding speed events on base. Your Legal Office can also help in framing your constitution and by-laws.

Again, good luck! Be sure to let us know when your club is active—and don't be shy about including information concerning club activities and events. ●

DECISION DRIVING is a positive approach to accident-free driving. It enables the driver to translate the constant INPUT of traffic information he sees, hears, and feels into decisive, effective OUTPUT. Because the Decision Driver knows what is happening or what may happen around him, he always acts quickly to avoid trouble.

DECISION DRIVING

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Adapted from a Liberty Mutual Loss Prevention Service pamphlet

The Decision Driving tactics discussed here can help you make the right decisions, every time.

By learning the causes of single-car accidents, which account for one of every three traffic deaths, the Decision Driver can avoid them altogether. This will also be of great help in keeping him from becoming involved in others. Here's how it's done:

THE VEHICLE

A vehicle in poor condition is often the culprit in a crash. Check brakes, lights, steering gear, horn, tires, and wipers before and after every trip, and have defects corrected immediately.

If a tire blows don't panic. Instead of braking, which might cause you to lose control, hold steady and coast to a safe spot off the road.

THE ROAD

Sharp curves, sudden bumps, and bad potholes, are waiting to catch you unprepared.

Don't get thrown by a curve. Look far down the road so you can see an unmarked curve ahead and slow down before you enter it. Watch for signs that warn of curves. They often tell the direction and degree of the curve, and sometimes suggest the safe speed. When you have slowed and entered a curve, don't coast; apply steady power and resume acceleration as you leave it. But, many fatal accidents occur on straight roads as on curves, so be alert all the time.

The roadside shoulder, a haven in an emergency, can be treacherous if a wheel drops onto it at high speed. If this should happen, don't panic, don't brake, and don't try to steer back onto the road while you are still going fast. Just coast along to a safe speed, keeping the car on a straight course. Steer back onto the pavement *slowly* at a sharp angle when you are sure no one can hit you from behind.

Be on the lookout for road hazards such as dips, narrow bridges, bumps, and railroad tracks. Hitting any of these at high speed can cause you to lose control. And slamming on your brakes so hard that wheels lock will cause a bad skid.

THE TIME AND THE WEATHER

Turn your headlights on early at sundown. Driving with parking lights on is dangerous and illegal. Don't overdrive your headlights. If you see something ahead that you can't make out clearly, slow down immediately; it might be a stalled vehicle, an animal, or a person.

OVERDRIVING HEADLIGHTS

Rain, snow, and fog are constant threats to drivers. The best way to weather the weather is to adjust your speed accordingly. Posted speed limits are for ideal conditions. Slow down in rain, snow, or patchy fog. Get off the road completely in heavy fog and turn your lights off so other drivers won't think you are still on the road and hit you from the rear.

Avoid locked-wheel skids by pumping and stabbing your brakes when stopping on slippery roads. Press and release them quickly once or twice a second. This gives alternate intervals of braking and steering control. If you skid, steer in the direction the back of the vehicle is sliding.

THE OTHER DRIVER

Many drivers have crashed into telephone poles, trees, parked cars, and ditches to avoid other vehicles. If you are in a situation where a vehicle is coming toward you (as in passing) and the distance is too short for safety, slow down immediately, flash your lights, blow your horn, and pull to the right as far as possible. Pull onto the shoulder if necessary. Never try to dodge the oncoming vehicle by swerving to the left. The other driver may cut back into his lane when he realizes the predicament. If you're there you'll be hit. He'll claim the accident was your fault because you were on his side of the road.

YOU

All driving hazards become worse when you're not at your physical and mental best. Lack of sleep, hunger, illness, and alcohol slow your reflexes. Certain medicines impair driving performance. So-called "stay-awake" drugs may actually put you to sleep with your eyes open, and there will be no warning nod.

Everyone has a limit to endurance. At the first sign of fatigue—droopy eyelids, stiff neck muscles, decreased awareness—pull over to a safe spot, get out and stretch your legs, and breathe deeply. Get a cup of coffee. If you're still drowsy, take a nap. The Department of Transportation prohibits more than 10 hours of driving in a 24-hour period for commercial drivers. The driving day should be considerably shorter for pleasure drivers.

Always drive with both hands on the wheel. Hold it firmly but not tensely. Without a good grasp, the wheel can be yanked from your hands by a blowout, pothole, or rock. By the time you're in control again you may be off the road.

If you have to check a map, dig toll coins from your pocket, shoo a bee, take off your jacket, or do anything else that takes your hands from the wheel, pull over to a safe place and stop. It may take a little extra time, but may save your life. ●

HOW GOES IT?

A monthly recap of selected accidents—presented solely in the hope some will benefit from the unfortunate experiences of others

Rank: Sgt **Age:** 22 **Type vehicle:** 1970 Triumph TR6 Conv

The Sgt's car was in top condition, he had no traffic accident record, and had a reputation of being a good driver. . . with the exception of usually using a "heavy foot."

After about 6 hours' sleep the previous night, he drank beer with three former overseas buddies until 0100. Then they headed back to base, two to a car. At about 0115 the Sgt dug out and passed his other two friends at 55 mph in a 45-mph zone. He completed the maneuver and entered a sharp curve just as an approaching car drifted over the center-line. He swerved onto the graveled shoulder to avoid a collision, and his car skidded into a ditch. It traveled for 117 feet, then became airborne and impacted a large tree, head-on.

The Sgt was thrown out and killed, and his Amn passenger sustained serious fractures and facial lacerations. No seat belts were in use.

Probable cause: Loss of control.
Contributing factors: Drinking and driving; imprudent speed; poor judgment; fatigue.

Rank: A1C **Age:** 20 **Type vehicle:** 1968 VW 2-door

The Amn First was driving in the rain, and visibility was restricted by fog. The windows were closed, and a four-speaker tape deck was playing rock-type music at high volume as he drove onto a railroad crossing while flashing red crossing signal lights and warning bells were operating. A train, with headlight on, white warning light oscillating, and horn blowing, struck the VW at the left door handle at 38 mph. The driver was pronounced DOA at the hospital.

Probable cause: Inattention.
Contributing factors: Low visibility; noise drowning out warning horn; inactive crossing signal arm.

Rank: A1C/A1C/Sgt **Age:** 20/20/22
Type vehicle: 1955 Buick 4-door

It was early morning, and an Amn First was driving. Another Amn First occupied the front seat, and a Sgt was asleep on the back seat. They were heading toward the driver's home, some 237 miles from their base.

The driver nodded, the left wheels went into the grass median, and the uncontrolled vehicle impacted a concrete abutment before flipping onto its top.

The driver, who was not buckled in, was hospitalized with a severed radial artery and nerve root in his right arm, fractured pelvis, and ruptured urethra. The sleeping Sgt, who also was not strapped in, suffered serious facial and scalp lacerations, ruptured spleen, spinal injuries, and brain concussion. The right-front-seat passenger, whose seat belt was fastened, escaped with minor contusions and abrasions to his forehead.

Probable cause: Loss of control.
Contributing factors: Speed too fast for existing road and driver's physical condition; fatigue.

Rank: SSgt/SSgt **Age:** 27/34
Type vehicle: 1965 Ford Conv; 1968 VW, 2-door

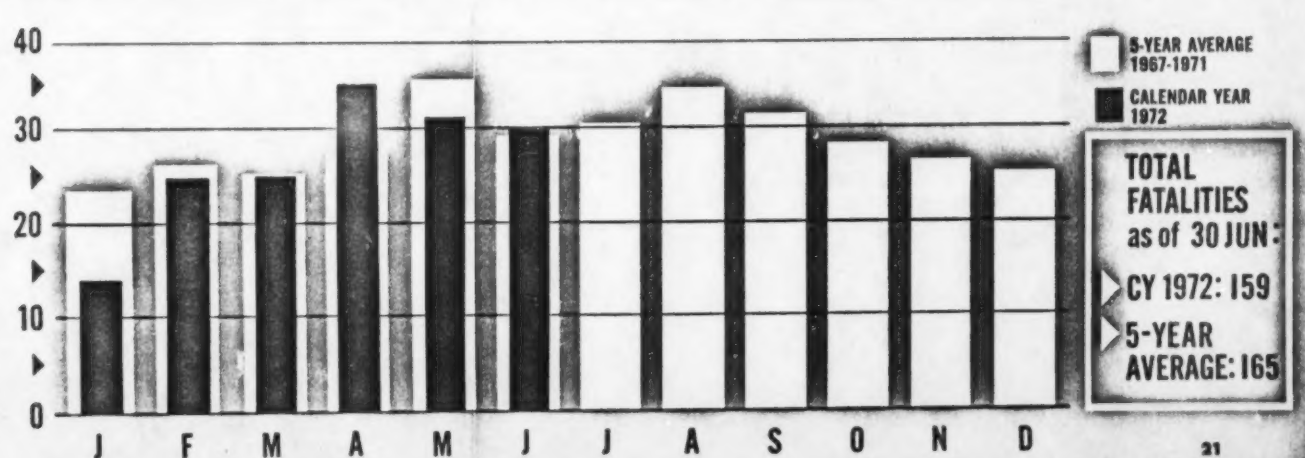
A SSgt received narcotic medication as an outpatient, then drank beer for 8 hours before driving toward town. At about 2020 he drove through a flashing red light at 60 mph in a 45-mph zone and crashed into the driver's side of another SSgt's Volkswagen. The outpatient SSgt received only mouth lacerations when his face bounced off the steering wheel, but the other SSgt was crushed and killed by the steering gear when his VW flipped and landed upside down. Neither driver was belted in.

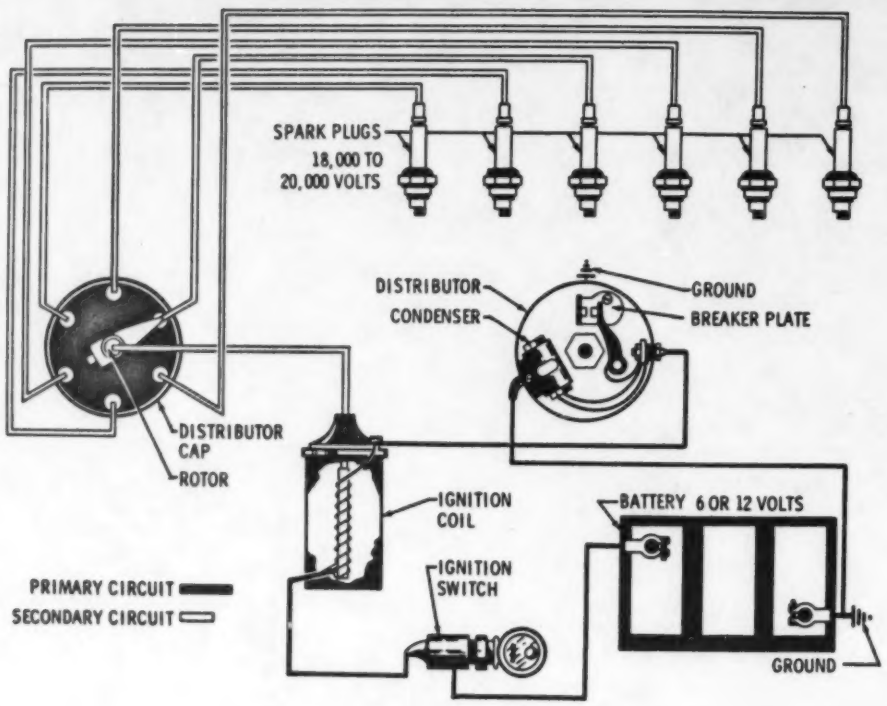
Probable causes: Inattention; disregard for traffic signal light.
Contributing factors: Drinking and driving while under narcotic medication.

Rank: Sgt/Sgt **Age:** Unk
Type vehicle: 1971 Suzuki Motorcycle 125cc
1972 Yamaha Motorcycle 250cc

A Sgt on a rented 125cc Suzuki passed on the wrong side of a bus and crashed head-on into a 250cc Yamaha. The Sgt riding the heavier bike was a base motorcycle club member, was wearing his helmet and heavy gloves, and suffered only a broken leg. The other rider, who wore no protective clothing or equipment, received fatal head injuries.

Probable cause: Improper passing.





In the April issue, we gave you "Basic Electricity for Auto Mechanics." In May, we published a four-page photo spread showing how to time the ignition. This month we show you where the ignition system's related parts are located, and how to keep them operating properly.

The heart of your automobile engine is its ignition system. It is responsible for creating the spark which ignites the fuel within the engine. Without this spark, your car becomes just so much dead weight. The ignition system is probably the least understood portion of the auto engine, and the major cause of poor performance and unscheduled stops.

Follow us through the ignition system step-by-step, and we'll give you a thorough understanding of the pieces involved and how they function. Then we'll tell you how to keep your ignition system in good repair so you can get good mileage, good performance, and a good measure of reliability from your automobile.

The parts of the electrical system involving initial engine ignition are: the battery, ignition switch, coil, distributor, spark plugs, fuses, meters, grounds, switches, and many feet of wire in varying diameters.

The *battery* is the primary source of electrical power for the engine. Basically, the battery produces electrical energy for starting the engine. Once started, the generator or alternator takes over the function of the battery by converting mechanical action to electrical energy. The voltage regulator maintains a constant charge to the battery. However, if engine speed during idle is adjusted too low, the battery will be forced to deliver the power to operate the electrical system after the engine is started. If your car has an ammeter gage, it will show a discharge condition at idle if engine speed is too low. Or, if your car is equipped with a warning light, the light will glow. If your ammeter shows more than a slight discharge, or if the warning light stays fully on, the idle speed should be increased to prevent premature battery failure (provided the voltage regulator is operating properly).

The power created by the battery and generator (or alternator) passes through the *ignition switch*. This switch is activated by a key and has the following positions: *off; accessory* (supplies power only to selected accessory devices such as the radio); *on* (supplies power to the entire electrical system); and *start* (activates the starter motor to initially turn the crankshaft

COMPLETE IGNITION TUNEUP

and start the engine). On many older cars, the starting function is accomplished by depressing a button after turning on the switch.

The *coil* is actually two separate systems of wire (primary and secondary wire coils) combined in one housing. As the names imply, these are wires compressed in a "coil" shape. The primary wire coil is located inside the secondary wire coil.

As with the ignition coil, the *distributor* has both primary and secondary systems which combine to provide the necessary sequence in electrical charges passed to the spark plugs. This sequence assures that the different cylinders will produce power in a predetermined series. This timing of power strokes among the various cylinders is necessary to keep the crankshaft turning at an even rate.

The primary side of the distributor contains the *breaker points* and *condenser*, both located on a plate in the middle of the distributor body. The secondary system is composed of the *distributor cap* and the *rotor*.

The bottom half of the distributor is a cylindrical housing which contains the *distributor shaft*. This is driven (through a gear arrangement) by the engine's camshaft. In the upper part of the distributor body, the distributor shaft carries a cam wheel with a point, or "lobe," for each cylinder in the engine. The shaft rises above the cam wheel where the rotor is mounted. As the shaft turns, so does the rotor.

Located adjacent to the cam wheel are the breaker points, a V-shaped pair of arms hinged at the bottom, and having electrical conductors at the arm ends. These arm ends are called *point contacts*, and complete the primary circuit which directs the electric current from the source to the coil, and to the breaker points.

Now that we've shown where the parts in the ignition system are located, let's follow the electrical current from the source to the point where it starts the fire inside the engine.

Electric current (either 6 or 12 volts, depending on the particular car) is carried by a wire through the ignition

continued

1 Before starting to work on electrical system, it's a good idea to check the battery cable for corrosion, and disconnect hot lead (the cable that doesn't run to a ground). The latter can prevent part of the electrical system from burning out. But, first, remove your watch and jewelry.

2-3 Make close visual inspection of all wiring. Check for broken wires and cables, frayed or heat-cracked insulation, bad connections (2). If in doubt on an item, replace it. Check wire clips for tight fit on spark plugs, distributor cap, coil (3). Squeeze with pliers if loose.

continued

COMPLETE IGNITION TUNEUP

switch to the coil's primary wires. From the coil, the current travels into the primary side of the distributor to the breaker points.

The distributor shaft turns the cam wheel attached to it. Each cam lobe causes a point contact to separate for a split second—thereby breaking the primary circuit. The condenser then comes into play, giving a sharp, clean break in the energy flow.

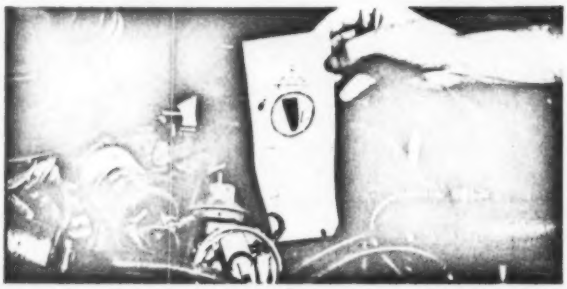
This split-second break in the primary circuit causes a power buildup in the secondary system of the coil. Although it is only momentary, the voltage may climb to as high as 20,000 or 25,000 volts from the original 6 or 12. Such a voltage gain is required to produce enough spark to burn the fuel/air mixture efficiently.

This high voltage is carried from the coil to the distributor cap by a heavily insulated wire running from the center of the coil end to the center of the distributor cap. The current is carried down through the cap by a contact which mates to a similar contact in the center of the rotor. As the rotor is turned by the distributor shaft, current is carried to the rotor's end which, in turn, passes the current to a series of contacts located about the inside circumference of the distributor cap. Each of these distributor cap contacts is connected to a spark plug by a heavily insulated wire.

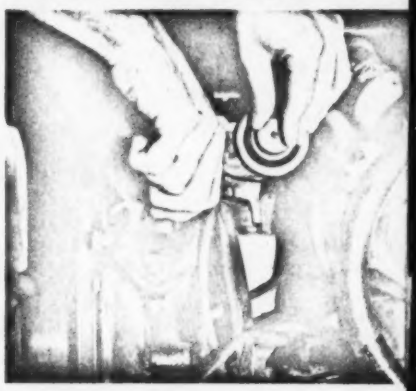
The spark plug is simply an electrical conductor (the electrode) surrounded by a non-conductor made of porcelain. The electrical current from the distributor passes down the conductor to a gap. A spark is created as the current jumps the gap, which ignites the fuel/air mixture in the cylinder.

4 **Pull high-voltage lead** from center of coil, disconnect distributor-to-coil primary wires as indicated by screwdriver blade.

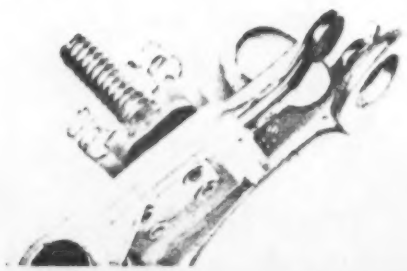
5 **Pull vacuum advance hose** from distributor and remove cap. If necessary, remove some plug wires so cap can be pulled well away from distributor. Be sure to mark wires and cap terminals so everything goes together properly when work is done. Make drawing of rotor position and relationship of distributor housing to surrounding area. Items have to go back in just the way they came out. Without help from drawing, it is possible to install distributor housing while distributor shaft is 180° out of phase. This can result in serious engine damage, so be careful. Correct rotor position assures proper shaft placement.



6-7 **Easy way to work** is by removing distributor, but this is not necessary. If you do plan to remove it, use file or knife to make mark on plate that holds distributor in place (or on engine block) and corresponding mark on distributor shaft.



10 **Rotate distributor** shaft so points close. Check alignment. Rotate shaft to open points and check again. If distributor is left in engine, connect battery and use starter to rotate shaft. If alignment of point contacts is off, bend stationary arm (one closest to cam). Check points for transfer of contact material from one contact to other. Slightly worn points can be filed (with points file only). If well worn, replace them. Check point color against chart.



11A-11-12 **Insert:** Close-up of points (left) and condenser. Arrow on points indicates lifter which is activated by distributor camshaft lobes to open point contacts. If points are to be replaced, use ignition pliers to loosen nut where wires connect to points (11) and use screwdriver to remove condenser (12). Remove screw at base of points and lift out points, condenser, and wires for reassembly with new parts.

The battery is a complete electrical unit from which power is tapped. As such, it requires a ground cable, usually running from the negative post atop the battery to either the chassis of the car or the engine block.

The primary ignition circuit is grounded by a wire running from the condenser to the battery ground cable. The secondary ignition circuit is grounded by the metal threads on the spark plug where the plug screws into the cylinder head casting.

As stated at the beginning of this article, basic auto electricity and ignition timing instructions appeared in the Apr and May issues, so this completes the ignition system. Now you know where the bits and pieces go and what their functions are. You can follow through on the illustrated instructions that follow, and keep your car's ignition system in top operating condition. We've also included a guide to troubleshooting the system, so you'll know what to do if it fails and leaves you stranded with a dead engine.

An hour spent now can save you many more stranded on the road. Take your time, study the photos and instructions, purchase the proper ignition tuneup kit at a discount through your base auto hobby shop, and check out an ignition tool kit.

You'll also need point and spark plug gap specifications for your car. If your auto hobby shop attendant doesn't have the manual, call the local dealer for your make of car or get the info from your local parts house. In any event, get it and keep it handy. •

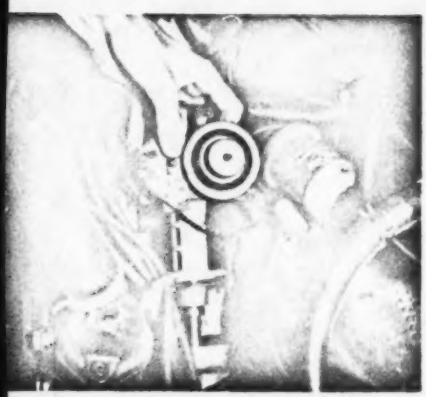
Now, if you want to polish the job off by timing the ignition, obtain the proper timing spec; then check out the needed timing tools and instruments and follow the instructions given in "Put Some Spring in Your Engine," May '72 DRIVER.

And remember, as noted in "Correction," page 27, if the dwell reading is higher than called for in the spec for your car, increase the point gap. If the dwell reads low, decrease the gap.

Take your time, study the photos, and follow the directions. •

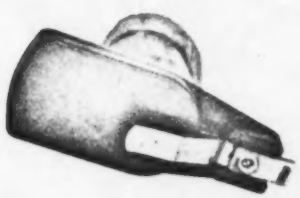
continued

This, coupled with rotor drawing, will get the distributor back in properly when work is done. Take your time. This is important. Just loosen the bolt(s) and pull the distributor out.

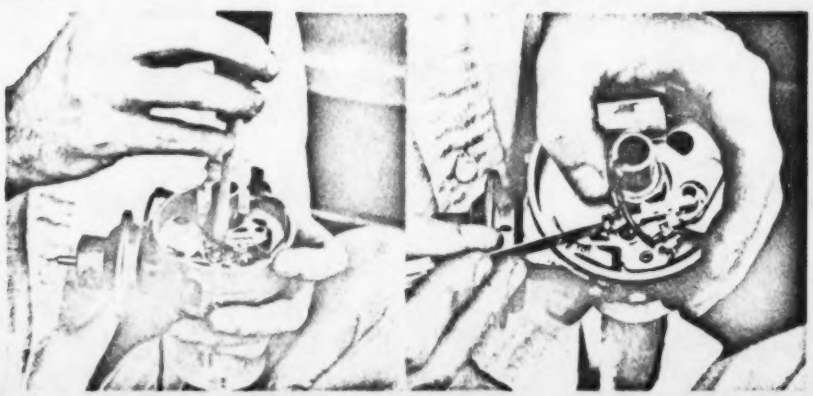


8 Inside of cap should be checked closely for burning, excessive carbon deposits on contacts. Light carbon can be scraped or filed away; heavy deposits call for new cap. Check entire cap for cracks and replace it if any are found.

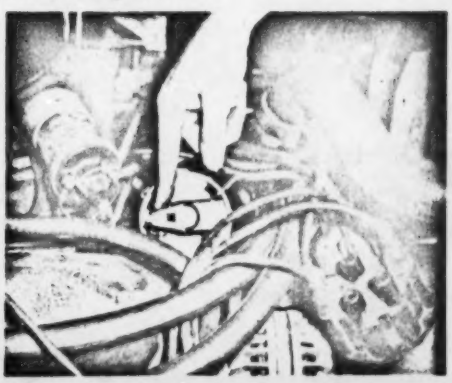
9 Rotor slides over top of distributor shaft, rotates with it. Current enters at top of distributor cap and is picked up by metal strip at center of rotor. "Juice" runs to end of strip, is passed to spark plug contacts located about outer edge of distributor cap. Check contact strip on rotor top for excessive carbon deposits or burning. Use file for light deposits. Check rotor top for cracks, and replace if necessary.



13-14 With points and condenser in place, rotate distributor shaft so that points are fully opened (points lifter is on crest of cam lobes). Loosen points-attaching screw slightly (13) so points can be opened by hand or with screwdriver to shift plate that holds points. With points fully open, use feeler gage (14) to set proper opening. Gage should slide between point contacts with slight drag. When the gap is right, tighten screw.



15 Reinstall rotor and push against normal direction of rotation after replacing distributor. Rotor should spring back. If it doesn't, vacuum advance unit could be bad. Or, if distributor has seen lots of service, springs under point plate may need replacement. Lube distributor cam with dab of grease.



continued

COMPLETE IGNITION TUNEUP

TROUBLESHOOTING A STALLED ENGINE

1

Take off your watch and ring, then remove air cleaner and sight down carburetor throat while working throttle linkage by hand. You should be able to see gas squirting down into throat. If not, the trouble is in the fuel system.

2

If carburetor seems to be working, try to start car for 10 to 15 seconds; then remove one spark plug. It should be wet with fuel. If not, gas is not getting into the cylinders and the trouble is still in fuel system.

3

Pull wire off one spark plug, then hold near metal while cranking the engine over with extension starter. Wear a glove or wrap a dry rag around the wire to avoid a shock. Spark should jump from wire to metal. If it does, remove all plugs and clean with emery board or sandpaper. Gap can be adjusted to equal five thicknesses of newspaper. This is rough gap. Do it right with a feeler gage as soon as possible.

4

If spark does not jump to ground from spark plug wire, make visual check for the following: distributor cap loose or cracked, wires broken or pulled away from mounting point, broken spark plug, battery cable corroded, disconnected or broken, rotor broken, faulty fuse(s).

5

Remove distributor cap and check points for dirt, oil. Check gap with feeler gage or four thicknesses of newspaper. Sandpaper from match box can be used in emergency only to clean points.

6

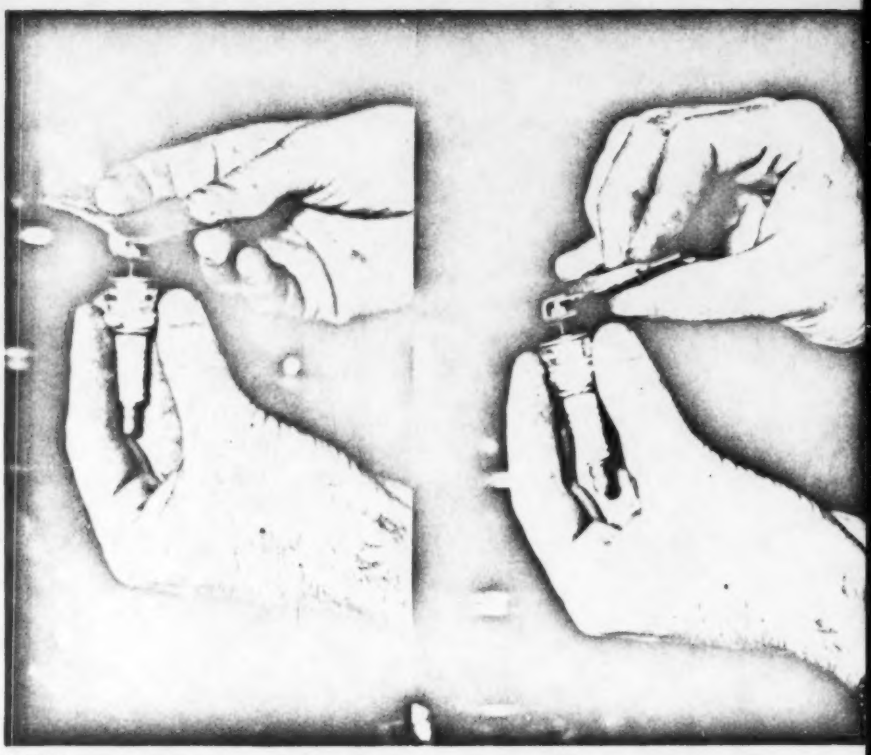
Rotate engine with starter until point gap closes, and leave ignition switch on. Disconnect heavily insulated wire from coil to distributor, at the distributor, and hold end ¼- to ⅜-inch from a metal ground. Spark will jump from wire to metal if coil is good.

7

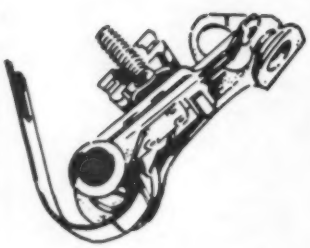
Starter switch may be at fault. Find wire leading from starter to starter switch and wire leading from starter switch to coil. Use a length of insulated wire to connect starter and coil, by-passing starter switch. If engine starts, switch is at fault. Be sure nothing is in the path of the cooling fan blades.

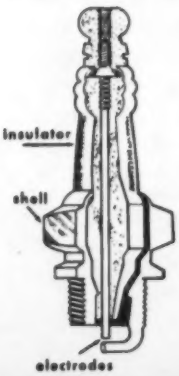
8

If engine fires when ignition switch is turned on, but quits when switch is released to running position, the resistor (usually located next to coil, resembling a large point condenser) is bad and must be replaced.



16-17 Remove spark plugs and check color of porcelain against chart. Use fine sandpaper to clean electrodes. Set electrode gap with feeler gage by bending outer electrode. Go easy. It doesn't take much to break an electrode. And take care with the shiny, white porcelain insulation. It doesn't take much to chip or crack it. If they are not in good condition, replace them. Space spark plug cables as far apart as possible, and don't risk cross-firing by running them parallel.





IGNITION TUNE-UP COLOR CHARTS

Breaker Point Color Analysis:

light-gray	normal
black	oil vapor, grease from cam
blue	excessive heating due to poor alignment, high resistance, or open condenser circuit

Spark Plug Color Analysis:

chocolate brown	normal
white to light brown	lean: too little gas, too much air; too much advance in timing
black	rich: too much gas, too little air; too little advance in timing

continued from page 2

DOUBLE CLUTCH

safety facts, but nothing on "outtracking."

In addition to several other recommendations, the Wing Ground Safety Director recommended that: "Special emphasis should be given to the 'outtracking' phenomenon which is described in the May issue of DRIVER magazine;" also that: "As the popularity of the two-wheel motor vehicle continues to grow, we can anticipate more accidents involving novice operators. Therefore, recommend that the editorial staff of DRIVER magazine periodically publish articles aimed at the new cyclist."

The Command IG Safety Chief came to DRIVER'S rescue by stating: "Reference safety officer's recommendation, AF Form 711a, a review of DRIVER magazine issues for the past 3 years indicates that ample novice motorcycle operator articles have been published."

You can be assured that the DRIVER staff will continue to publish such articles in a ratio commensurate with the afore-stated observation: "As the popularity of the two-wheel motor vehicle continues to grow. . . ." ●

continued from page 9

THE LAW AND THE AUTOMOBILE

be held liable under the *"subsequent negligence"* rule, since you may have been negligent in failing to observe the other car; or you might be held negligent but not liable because the other driver had caused the accident situation and you did not observe his position of peril in time to prevent the crash. However, you may not be able to collect damages because your negligence contributed to the accident. In most states your *contributory negligence* would be a good defense for the other driver.

Confused? Well, the message we meant to convey was—it pays to drive defensively. You cannot always depend on "right-of-way" from either a legal or safety point of view. ●

FOR BIKE NUTS ONLY

Protect Rubber Goods from the Ozone

Normally, a motorcycle rider doesn't stop to consider how many items on his machine are made of rubber besides his tires. The gas tank is usually mounted with rubber grommets. Cable ends at the cases have a rubber boot of some sort. The rear shocks have rubber inserts at the mounts, and the instruments (speedo and tach) are mounted on rubber or have a rubber sealing ring of some sort.

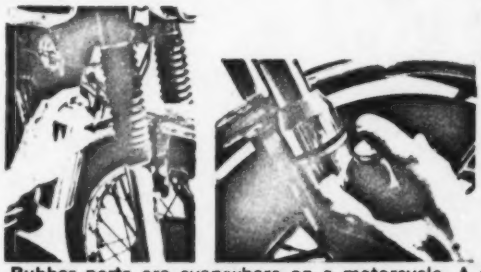
Scientists tell us the reason for weather-checked tires and rotting cable boots is the high content of industrial and automotive residue present in the air. In the heavily motorized and industrialized regions it is called "smog." But, whatever you call it, the problem is pretty widespread.

Fortunately there is something we can do to protect the rubber items on our motorcycles and to make them last longer. Silicone spray can provide excellent protection from the elements for all these components on your machine.

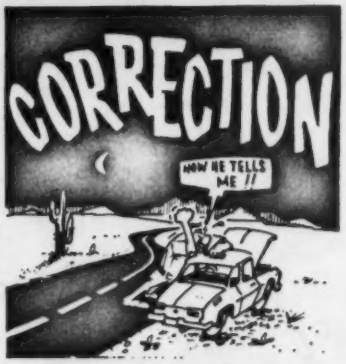
It is best to start using the spray as soon as you acquire a bike. Spray it on the tire sidewalls, cable boots, and all other rubber components on the machine. Make this a regular habit when cleaning the machine and you will curtail the tire weather-checking and rotting that is normally blamed on the manufacturer. Not only will it afford good protection, but items retain that nice, black, brand – new look and thus add to the appearance of the machine, as well as increase its resale value.

Aerosol spray cans of silicone are readily available. If your local dealer doesn't carry it in stock, most auto parts stores carry a couple of different brands. There are some brands on the market that contain both silicone and graphite; this kind should not be used. ●

Information courtesy Rod Breaker, CYCLE NEWS magazine.



Rubber parts are everywhere on a motorcycle. A careful check while cleaning your machine should uncover most of them. Don't forget to look under your seat, if it is the hinged type. Avoid spraying the surface of the tire that comes in contact with the road. Wipe off excess silicone spray with a rag as you go.



In the scramble following our Technical Editor's departure, the garbled "decrease/increase" in the point gap ("Put Some Spring in Your Engine," Photo 10, page 20, May '72 DRIVER) slipped through our proof readers. Anyone trying it would soon spot the error; if you haven't, the instruction should read: "If the dwell reading is excessive (again, check the book), *increase* the point gap. If the dwell reads low, *decrease* the gap." ●

ANSWER TO WHAT SHOULD YOU DO?

See back cover before reading

Your best course of action is A. TAKE FOOT OFF THE ACCELERATOR, AND STEER SLIGHTLY LEFT TO GET BACK ONTO ROADWAY. These actions will keep you from getting hung up in the gravel. Making a sharp turn while braking would only make your problem worse, since the wheels will turn even more in the wrong direction; the gravel will pile up and force the tire to slide sideways instead of rolling up and over. The gravel will slow the car, so you really don't need to brake. Just steer gently through it, so your car won't "slue" around in a direction you don't want. ●

ABOUT MISS DRIVER

SEE PAGE 8

Spritely Miss Martha Laham is a resident of Covina, California. The 19-year-old lovely is in her third year at Cal Poly majoring in Theatre Arts. When not studying, Miss Laham pursues an active program of physical activity that includes acting, modeling, skiing, gymnastics, and dancing (Modern, Jazz, and Interpretive). Martha is alarmed by the close calls she has had on the highway, caused by lazy or unthinking drivers. She says, "The most important need today is for improved defensive driving by all drivers." ●

LETTERS TO THE EDITOR

BACKFIRE

Address your letters to:
Editor
DRIVER Magazine
AFISC/SEDD
Norton AFB CA 92409

Reference Colonel Bretzius' letter, May '72 DRIVER, let me make one thing perfectly clear! I am an advocate of left-foot braking. I have used this procedure since I bought my first automatic transmission back in 1952, and consider the overriding benefit to be *speed*.

The time-lapse between lifting the right foot from the gas pedal, placing it on the brake, and applying pressure, is even greater than the time of perception that brakes will be needed. A glance at any stopping-distance chart reveals that a considerable portion of the total distance traveled is taken up in this decision-making process. However, if the left foot is in position on the brake, pressure application is almost instantaneous. This faster reaction gives a 20- to 30-foot margin of safety and has saved many grilles!

Now to counter the arguments of those who disagree:

"Riding" the brake pedal and causing the brake light to glow does confuse the driver behind. But this is merely a malpractice. The left foot should touch the pedal, but not hard enough to depress it—until braking is needed. Moreover, this position is to be maintained only in traffic situations where a defensive driving approach is required; not on the open road and in the clear. If in doubt, you can check your foot pressure by having a friend follow you. If you are so heavy-footed that the light comes on, he can honk and let you know.

Making smooth stops is also a matter of practice. If my wife could (and did) learn this technique after years of right-foot operation, certainly any red-blooded American boy (or girl) can do the same.

The same thing applies to confusion as to which foot to use on which pedal during a panic situation. Personally, I feel this aspect is far too over-rated; the better driver keeps tabs on what's going on around him, and is prepared to use the proper controls in any situation. Anyone who invades today's traffic in a *non compos mentis* mental state is sure to make accident situations out of what should be free-flowing traffic (shades of the idiot who blithely barrels down the freeway with his directional signal flashing). This type probably wouldn't realize that he was having to use more throttle because his brakes were dragging!

Col James A. Talbot
(USAF Ret)

Local highway patrolmen say they use right-foot braking, but are highly trained in a different sort of driving than is the average motorist. Some driving instructors teach the right-foot method, claiming the students might stiffen both legs and depress the gas pedal in a crisis. MSgt David R. Malcolm, 1st Sgt, 3478 Student Sq, Keesler AFB, wrote that he brakes faster and more smoothly with his left foot, and doesn't drag the brakes. Capt Morgan C. Ward of Vandenberg AFB sent us clippings from "The Mail Bag," TRAFFIC SAFETY magazine, indicating a truck driver and a motorist prefer right-foot braking. However, one of the letters, from a Supervising Driver Improvement Analyst, stated the California Department of Motor Vehicles takes a neutral position on this, and that the examiners are instructed not to score down for left-foot braking; only for simultaneous use of gas and brakes. He also added that he has seen left-foot brakers make impressive demonstrations of their claims that they can get the left foot onto the brake pedal faster. So it seems to be largely a matter of preference, despite the claims that use of the left foot results in faster braking reaction.

DRIVER feels left-foot braking can be superior IF the pedal is "covered," and the brake never dragged, during critical periods.

In a recent government vehicle accident a 5-ton maintenance van was lost in an unfortunate but preventable accident. Through investigation of the accident it was brought to my attention by the Safety Officer that the van was lost because of a *conditioned response*. I had never thought of this as being an accident cause, but after an explanation by the Major I bought it 100%.

Here it is in a nutshell; a person's natural response to a situation wherein a vehicle leaves the road is to get it back onto the road. In this case that was the wrong reaction to take. Had the driver retained full command of his faculties, he could have driven into a nearby ditch and stopped without damage; but through a conditioned response he attempted to bring the van back onto the highway. Being top-heavy, and at a 45-degree incline, the van overturned and came to rest on its side. In summary, be aware of the *conditioned response*. In some instances it is not the best reaction to a traffic situation.

TSgt Earl Brewer
90 MIM Sq Safety NCO
F E Warren AFB WY 82001

Agreed, but it seems to have been more of a "panic response." We would hope that our drivers (GMV and PMV) would condition themselves to retain control in any driving situation (see "Decision Driving," p. 20). The driver should have asked himself what would happen if he did get back onto the highway, only to find another vehicle entering that space.

This is to show my appreciation for a job well done!!! DRIVER magazine is like. . .groovey. . .crazy. . .WOW! Keep up the good work!!!

SSgt C. C. Duell III
437 Mil Alft Wg
Charleston AFB SC 29404

Your letter is a masterpiece of brevity, replete with highly digestible expletives. For a reader to take the time and trouble to write and express his pleasure is a highly appreciated gesture.

We find DRIVER magazine material timely, accurate, and extremely interesting. Congratulations to your staff.

I have recommended that all driver education instructors in this region subscribe to DRIVER, as a resource periodical for their classes.

I think, in terms of analyses and being realistic, your "How Goes It?" feature is the best I've seen. I only wish that we could encourage our news media to do the same thing.

Paul T. Rooney, Project Dir
Cen Minnesota Tfc Safety Cen
School Dist 742
St Cloud MN 56301

Thank you. Military driving instructors and safety personnel, take note.

☆U.S. GOVERNMENT PRINTING OFFICE: 1972—789-142/12

"Better get a move on, we've got only 15 minutes till the Trophy Dash!"

"Hey, Herb, get up and close the window, there's an awful draft in here!"

what should you do ?????

You're driving on a two-lane road. You go into a curve a little too fast and find yourself off on the right shoulder in loose gravel. What should you do?

A. Take foot off the accelerator, do not brake, and steer slightly left to get back onto roadway.

B. Take foot off the accelerator, brake lightly, and make sharp turn back onto roadway.

See page 27 for answer

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